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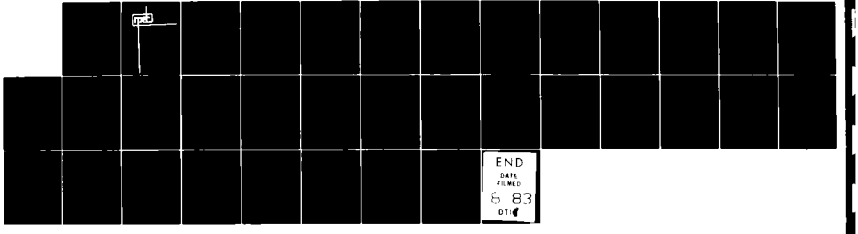

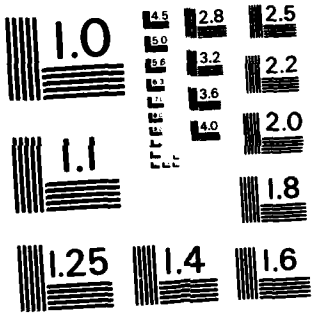

NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER SAN DIEGO CALIFORNIA 92152

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DEVELOPMENT OF A MANAGEMENT TECHNIQUES INVENTORY

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FOREWORD

This research and development was undertaken as part of the 6.2 Motivation and Productivity Assessment Work Unit PF55.521.021.03.01. It was directed toward collecting information on Navy managers' perceptions of various leadership techniques and toward evaluating the inventory designed for this purpose. Future work will be done to further develop the inventory.

Appreciation is expressed to the following individuals: LCDR John Maheu of the Office of Civilian Personnel and CDR Richard McGonigal and Dr. James Arima, Naval Postgraduate School, for data collection; Carolyn McLandrich, for computer programming; and Tom Kuncik and Leanne Young, for data analysis.

J. J. CLARKIN
Commanding Officer

SUMMARY

Problem

As the social and cultural environment changes, organizations must adapt their management practices accordingly. It is incumbent upon the Navy to incorporate new knowledge about leadership techniques into its management practices. In order to do so, it is first necessary to measure the perceptions that Navy managers have of various leadership techniques and of their ability to use them.

Objective

The primary purpose of this investigation was to design and employ an inventory to collect information from a sample of Navy managers describing their perceptions of various leadership techniques. A secondary purpose was to assess the inventory itself, using the results of this assessment to further develop and refine the inventory.

Approach

An instrument called the Management Techniques Inventory (MTI) was developed. It contains sections in which the respondents rate the familiarity and usefulness of 12 management techniques, the appropriateness of these techniques to solve 10 specific problems, their skill in solving the problems, and demographic information. The MTI was administered to a sample of Navy officer and civilian managers.

Findings

Overall, the techniques which were rated as most familiar were also rated as most generally useful. On the average, the techniques chosen as most familiar were the more traditional, straightforward ways of influencing behavior (e.g., performance evaluation), while the more contemporary, sophisticated techniques (e.g., changing communication patterns) received lower ratings on these dimensions.

It was found that the techniques rated as familiar and useful were not the ones most frequently chosen as appropriate to solve the 10 specific problems presented. Among those problems, the respondents reported more skill in solving those which are task-oriented than those which are interpersonal, social-oriented.

The results were analyzed according to three demographic characteristics: military vs. civilian status; management level; and type of organization. Of these three, the only one which showed a great deal of difference was the military vs. civilian responses. The civilians rated themselves consistently lower than the military in terms of the familiarity and usefulness of the techniques as well as in their skill in solving the problems.

Conclusions

The results suggest that there is a need within the Navy to impart knowledge and skills to managers regarding contemporary management techniques and problem solving. It is further concluded that the MTI has usefulness as a management assessment tool and potential usefulness as a management training tool.

Recommendations

The MTI should be considered for use as an assessment tool in the Navy by (1) those who are concerned with developing leadership and management training programs, and (2) those who are concerned with implementing such programs.

The MTI should be revised based on the findings in this study. Future research should be directed at refining the instrument and toward developing it into a leadership training package.

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INTRODUCTION

Problem

As the social and cultural environment changes, organizations must adapt their management practices accordingly. With advances in behavioral science, more sophisticated methods of leadership have become available, and our knowledge about their applicability has increased. It is incumbent upon the Navy, as on all organizations, to incorporate this new knowledge about leadership techniques to meet the changing neds of military personnel. Before deciding what is required in terms of increasing leadership skills for Navy managers, it is necessary to learn first what techniques and methods are presently being used. One aspect of managers' reliance on certain leadership techniques is the perceptions they have of various techniques and of their ability to use them.

Purpose

The primary purpose of this investigation was to design and employ an inventory to collect information from a sample of Navy managers describing their perceptions of various leadership techniques. A secondary purpose was to assess the inventory itself, using the results of this assessment to further develop and refine the inventory.

Background

There are two areas which explain the context in which the Management Techniques Inventory was developed. One consists of the Navy's need for information about its own leadership and management; the other consists of the instrument technology which has already been developed in the management field at large.

This information is potentially useful in a number of different Navy program areas in which there is need to know more about the leadership skill requirements of Navy managers. The simultaneous interest in leadership practices across a diversity of Navy programs is probably not coincidental; the rapidly changing requirements for managing technically qualified military personnel who are better educated and more affluent than previous generations represent a new challenge which is being felt at all levels of the Navy leadership structure. In the area of Leadership and Management Education and Training (LMET), a needs analysis is presently being conducted under the auspices of the Bureau of Naval Personnel to determine at what career points formal leadership training should be offered, what its content should be, and how it should vary across the different officer designators and enlisted rates. A comparable needs analysis is about to begin for Navy civilian managers under the auspices of the Office of Civilian Personnel. In the area of organization development, the Navy's Human Resource Management Program has a continuing need to enhance the leadership understanding and skill of Navy line managers who are charged with the responsibility for developing their organizations. In the area of productivity, the Productivity Enhancement program being developed under the auspices of

the Chief of Naval Material will, among other things, necessitate increased leadership skills. In the area of personnel research, the Navy Personnel Research and Development Center develops and tests methods for increasing motivation and productivity; however, successful implementation of such methods in the fleet is dependent upon knowing the existing skill levels among those for whom these methods are intended.

As far as the management field at large is concerned, there has been no instrumentation developed specifically to measure managers' attitudes toward particular techniques of management. The management inventories which have been developed for the most part focus on leadership style as opposed to use of techniques. Examples include (1) Vroom and Yetton's diagnostic tool (1973), which places managers' self-reported behavior on a continuum from authoritarian to participative; (2) the Managerial Grid (Blake & Mouton, 1964), which places managers' self-reported behavior on two dimensions--concern for people and concern for production; (3) the Leadership Behavior Description Questionnaire, which uses subordinates' perceptions of their supervisor's behavior to locate the supervisor's style on the dimensions of consideration and initiating structure (Fleishman, 1953; Stogdill & Coons, 1957); and (4) the Least Preferred Coworker Scale, which uses a semantic differential technique to measure the manager's overall approach to handling human relations (Fiedler, 1967).

Secondly, the inventories presently in existence base their assessment of managerial style on self-reports primarily of behavior rather than attitudes. Moreover, the items themselves tend to be fairly molecular; i.e., they inquire about specific behaviors as opposed to global ways of behaving. These specific items are used to comprise subscales; the responses to a subscale, taken together, are used to derive a global measure of attitudes or behavior. In addition to the examples given above, other examples include the managerial leadership items in the Survey of Organizations (Taylor & Bowers, 1972), the Executive Position Description Questionnaire (Hemphill, 1960), and the Management Position Description Questionnaire (Tornow & Pinto, 1976). Two frequently used instruments which do assess managers' attitudes toward supervision are the Leadership Opinion Questionnaire (Fleishman, Harris, & Burtt, 1955) and How Supervise? (File & Remmers, 1948). However, these instruments also tend to be molecular in their measurement approach and directed more at ascertaining management style as opposed to use of specific techniques.

In summary, first, the measuring instruments in the management field primarily measure managerial style using combinations of specific items present in subscales in a molecular mode. Second, these instruments have generally been directed at ascertaining the underlying dimensions and principles of managerial behavior in an attempt to better understand and explain that behavior. The instrument described in this report was developed to fulfill certain needs for managerial assessment which are not being met by the existing instruments. Specifically, it was felt that a tool is needed which describes attitudes which managers hold toward a variety of techniques at their disposal. The focus is on global techniques as opposed to either (1) specific components of managerial behavior or (2) underlying dimensions.

There are several reasons that an instrument of this variety is needed. First, the likelihood of successfully modifying managerial behavior depends partially on understanding the associated attitudes. Second, the contingency approach to management (i.e., there is no one best way to manage, it depends upon the situation) requires that managers have in their repertoire a range of techniques to call upon as appropriate. Yet, with the exception of Vroom and Yetton's instrument, there is nothing available to assess managers' self-perceived ability to utilize a wide variety of methods and to function in a variety of different situations. The extent to which managers will attempt to increase the variability and flexibility of their behavior will be partially dependent upon their perception that they are skilled and knowledgeable in a fairly wide range of managerial techniques and problem situations. Lastly, any success in undertaking an organization development intervention will depend upon whether the nature of the particular intervention is understood and accepted by management, especially top management. In the military, due to its strong hierarchical structure, this acceptance and understanding becomes absolutely imperative. Therefore, in embarking on an organization development program, it would be helpful to have an instrument for assessing the attitudes and skills of the upper management population.

APPROACH

Description of the Inventory

The Management Techniques Inventory (MTI) (see the appendix) consists of five sections. The first section asks the respondent to rate, on a five-point Likert scale, his familiarity with 12 techniques for "solving problems and enhancing effectiveness in organizations." The second section asks the respondent to rate each of the same 12 techniques "in terms of its usefulness to you as a tool to employ in your job."

The list of 12 techniques was synthesized from a general description of organization development methods in a chapter of a well-known textbook on organization behavior (Porter, Lawler, & Hackman, 1975). Each technique was given a name, followed by a brief description of what it entails. The domain of the techniques was meant to be broad; that is, they should represent a wide variety of methods, and be general enough to be usable by almost all types of managers. Moreover, all the techniques selected for inclusion were those which were felt to be straightforward and not highly technical or complicated. Six of the techniques primarily act on individuals directly (e.g., technical education/training) and six primarily act on something in the individual's organizational environment (e.g., job redesign). These techniques were interspersed, such that the "individual-centered" techniques are the odd-numbered items in the list, and the "organization-centered" techniques are the even-numbered items. It was believed that Navy managers would place more reliance on techniques which are more traditional and relatively less complicated to utilize. The organization-centered techniques overall are more modern in their approach to employee motivation and require more sophistication to use because factors outside the employees themselves must also be taken into account. Therefore, a hypothesis generated at the outset of the study was that the respondents would generally rate the "individual-centered" techniques as more familiar and useful than the "organization-centered" techniques.

The third section presents 10 specific problem situations; for example: "Your unit is faced with a personnel reduction." The respondent is asked to select from the list of 12 management techniques the three most appropriate to solve the problem and the three least appropriate. The problem set was reviewed for relevancy and meaningfulness by individuals in Navy management positions. The purpose of this section was to enable a comparison between managers' perceptions of the techniques in relation to specific situations vs. their generalized perceptions of the techniques obtained in the first two sections of the MTI.

The fourth section lists the same 10 problem situations given in the third section, asking the respondent to rate each of them on a five-point scale "in terms of how much skill/knowledge you have in solving them." It was surmised that relationships might exist between the skill levels of problems and the techniques chosen most appropriate to solve them.

The fifth section requests demographic information such as rank/grade and organizational position.

Data Collection

The MTI was administered to four separate classes of the Senior Line Management Institute conducted by the Office of Civilian Personnel (N = 88) and to two classes in human resources management at the Naval Postgraduate School (N = 29). Table 1 displays the demographic characteristics of the total sample of 117 respondents. No special instructions were provided since the MTI was designed to be self-explanatory. In most cases, the MTI was completed on the respondent's own time rather than in class. All responses were anonymous. There was approximately a 20 percent noncompletion of the inventory; this response is unlikely to have biased the results since the pattern of results of those classes with the highest response rate was fairly similar to the pattern of those classes with a lower response rate.

At one of the classes at the Naval Postgraduate School, in addition to collecting the data, a feedback and discussion session was held after the questionnaires were completed. This session had several purposes. First, comments regarding the comprehensibility of the items themselves were solicited to obtain ideas on how to improve the inventory. Secondly, the technique means and rank orders based on the responses already collected from the Senior Line Management Institute (N = 88) were presented so that the students could compare their answers to those of this reference group.

Data Analysis

Descriptive statistics (frequencies, means, and standard deviations) were computed on the entire sample. Similar cross-tabulated distributions were created for the major demographic categories and tests of significance performed on the differences in mean response for the various subgroups. The hypothesis that the respondents would rate the "individual-centered" techniques higher on the familiarity and usefulness scales than the "organization-centered" techniques was subjected to a unidirectional test for statistical significance.

The relationships between the difference scales in the MTI was investigated using correlation techniques; the underlying dimensions of the various scales were ascertained using factor analysis.

Table 1

Characteristics of Sample Given the Management Techniques Inventory

Characteristic	Frequency[a]	Percent of Total
Grade		
0-6	20	18
0-5	16	14
0-4	18	16
0-3	11	10
GS-15	6	5
GS-14	17	15
GS-13	17	15
GS-12 or below	8	7
Organizational Position[b]		
Commanding Officer	12	11
Executive Officer	6	6
Prospective Commanding Officer	9	8
Prospective Executive Officer	1	1
Technical Director	6	6
Department Head	22	20
Division Head	22	20
Branch Head	10	9
Staff Non-Supervisory	19	18
Organization Type[b]		
Operating fleet unit	13	12
Shore activity - direct fleet support	50	48
Shore activity - field activity	42	40

[a]The totals do not sum to 117 respondents since not all the respondents supplied this demographic information.

[b]Students at the Naval Postgraduate School listed their previous organization position and type.

RESULTS

The average responses of the entire sample on the MTI items are presented in the following tables. Each of these tables present the items in rank order by response average, beginning with the item having the highest mean or percentage.

Table 2 shows the mean ratings of the 12 management techniques in terms of their familiarity, and Table 3, in terms of their perceived usefulness. A repeated-measures analysis of variance on all the familiarity items showed statistical significance ($p < .01$) for the differences between the means ($F(11,1276)=16.92$) and between respondents ($F(116,1276)=8.52$). A Duncan's range test was applied using the criterion of $p < .05$ to all pairs of means in Table 2 with the following outcomes: "Performance appraisal" was significantly higher than all means below it in the table except "Technical education/training," and the latter was found to be higher than all means below it. "Group building" and "Administration of rewards and punishments" were significantly higher than all means beginning with "Variation in leadership technique." "Match job and person" was significantly higher than the bottom two techniques. A repeated-measures analysis of variance on all the usefulness items showed statistical significance ($p < .01$) for the differences between the means ($F(11,1276)=13.62$) and between respondents ($F(116,1276)=4.68$). A Duncan's range test produced the following significant ($p < .05$) differences between the means: "Technical education/training," "Performance appraisal," and "Match of job and person" were all higher than the remaining means. "Group building" was higher than the bottom two means.

Overall, both Tables 2 and 3 are highly similar, with a one-point spread between the highest and the lowest mean. Also, the rank order of the techniques in the two tables is very similar, indicating that those techniques which are familiar are rated as most useful. A Pearson correlation between the means of the familiarity and usefulness ratings was $r = .88$, indicating a strong positive relationship between the two sets of ratings. A test for the statistical significance between correlated means was done on each pair of familiarity and usefulness means; that is the difference between the mean familiarity rating and mean usefulness rating on "Performance appraisal." None of these 12 differences were statistically significant at $p < .05$. However, there are a few ways in which Tables 2 and 3 differ. "Administration of Rewards and Punishments" was rated as being familiar but not as useful, while "Job Redesign/Job Enrichment," which was rated as most unfamiliar, yet was rated as more useful than four other methods.

Table 2

Mean Ratings of Familiarity of Twelve MTI Techniques

Technique	Mean Response (N = 117)	Standard Deviation
Overall Across Techniques	3.50	0.72
Individual Techniques		
Performance Appraisal	4.13	0.84
Technical Education/Training	4.00	0.92
Group Building	3.72	1.00
Administration of Rewards and Punishments	3.70	1.07
Match of Job and Person	3.54	1.09
Interpersonal Education/Training	3.45	1.19
Variation in Leadership Technique	3.35	0.99
Direct Conflict Resolution	3.32	1.26
Change Communication Patterns	3.28	1.09
Distribution of Authority	3.20	1.22
Socialization	3.18	1.15
Job Redesign, Job Enrichment	3.16	1.07

Table 3

Mean Ratings of General Usefulness of Twelve MTI Techniques

Technique	Mean Response (N = 117)	Standard Deviation
Overall Across Techniques	3.51	0.59
Individual Techniques		
Technical Education/Training	4.14	0.93
Performance Appraisal	3.99	0.96
Match of Job and Person	3.84	1.01
Group Building	3.58	1.06
Interpersonal Education/Training	3.47	1.10
Direct Conflict Resolution	3.46	1.25
Administration of Rewards and Punishments	3.40	1.11
Job Redesign, Job Enrichment	3.37	1.03
Distribution of Authority	3.34	1.13
Variation in Leadership Technique	3.32	1.12
Change Communication Patterns	3.17	1.09
Socialization	3.07	1.10

Table 4 presents the same 12 techniques, this time in rank order according to the percent of times each was chosen as most appropriate to solve the 10 specific problems given in the MTI[1]. As shown, the top technique in Table 4 was chosen almost three times as often as the bottom one. A comparison of the rank order of the techniques in Table 4 to their rank orders in Tables 2 and 3 reveals that they are somewhat opposite (Spearman rank order correlations of -.21 between familiarity and appropriateness and -.29 between usefulness and appropriateness, neither of which is significantly different from zero at $p < .05$). In other words, the techniques which the respondents rated as being most appropriate to solve the 10 specific problems are the techniques which they found least familiar and least useful in general. By far, the technique ranked first as most appropriate was "Group building." This technique was rated third in familiarity and fourth in usefulness, thus being one of the minority of techniques rated similarly on all three scales. There were three other techniques which had similar rank orders across the three scales, "Match of job and person," "Interpersonal education/training," and "Distribution of authority." Thus these four methods were viewed relatively consistently in terms of their general and specific application. On the other hand, the techniques chosen as second and third most appropriate to solve the ten problems, "Change communication patterns" and "Variation in leadership technique" were rated as being relatively unfamiliar and least useful. Moreover "Performance appraisal," the technique rated as most familiar and second-most useful, was the technique chosen least often as appropriate to solve the ten problems.

Table 4

Percent of Time Techniques were Chosen as Most Appropriate to Solve MTI Problems

Technique	Percentage
Group Building	14.55
Change Communication Patterns	10.14
Variation in Leadership Technique	10.14
Direct Conflict Resolution	9.51
Match of Job and Person	8.56
Socialization	8.53
Interpersonal Education/Training	7.87
Job Redesign, Job Enrichment	7.26
Technical Education/Training	6.45
Distribution of Authority	6.19
Administration of Rewards and Punishments	5.50
Performance Appraisal	5.30

[1]The rank order of these techniques according to the percent of times each was chosen at least appropriate to solve the 10 problems was approximately the inverse of Table 4 (rank-order correlation coefficient, rho = .70). Therefore, the data on techniques chosen as least appropriate are not reported in this section because they were generally found to be redundant.

Table 5 presents the respondents' mean perceived skill in solving each of the 10 specific problems. A repeated-measures analysis of variance on all the familiarity items showed statistical significance ($p < .01$) for the differences between means ($F(9,1044)=33.37$) and between respondents ($F(116,1044)=7.47$). A Duncan's range test produced the following significant ($p < .05$) differences between the means: "Reports are late" is higher than all means starting with "Low product output/material readiness." All means including "Bickering" and above are higher than the remainder. All four bottom means are significantly different from one another with the exception of "Personnel reduction" and "Racial tension." There is a 1.4 spread between the highest and lowest mean. Individuals generally reported more skills in solving mission-related, task-oriented problems (e.g., "Reports are late," "Low product output/material readiness") than interpersonal, social problems (e.g., "Theft"), although there was an exception to this trend ("Rumors"). The skill items were subdivided on the basis of mean difficulty into two sets: (1) "easy" problems, which included the first six problems in Table 5, and (2) "hard" problems, which included the last four. The mean appropriateness rating for each technique was computed for the easy set and the hard set and compared. While there were differences for some of the techniques, overall, no meaningful pattern of results emerged from this analysis, suggesting no obvious relationship between skill level of problem and technique appropriateness.

Table 5

Mean Skill Rating in Solving MTI Problems

Technique	Mean Response ($N = 117$)	Standard Deviation
Overall across problems	3.32	0.73
Individual Problems		
Reports are late	3.91	0.84
Task Outside Scope of Mission	3.73	1.07
Rumors	3.69	1.04
Low Product Output/Material Readiness	3.57	1.00
Poor Performance Rating	3.54	1.06
Bickering	3.46	0.98
Personnel Reduction	3.11	1.22
Racial Tension	3.03	1.26
Personal Theft	2.75	1.16
Vandalism	2.52	1.14

The hypothesis that the individual-centered techniques would be rated as more familiar and useful than the organization-centered techniques was tested by comparing the means of the six odd-numbered items with the even-numbered items in each scale. The means of the individual-centered and organization-centered techniques for the familiarity scale were 3.67 and 3.34 respecitvely;

and for the usefulness scale, 3.65 and 3.37 respectively. Both differences were subjected to a one-way test and found to be statistically significant ($p < .001$), $t(116) = 6.81$ and $t(115) = 5.06$ respectively. Therefore, the hypothesis was confirmed.

An analysis was done to determine what differences existed between the responses of the various subgroups in the sample. Three sets of comparisons were made: (1) military vs. civilian respondents; (2) upper management (CO, XO, TD) vs. middle-lower management (department head, division head, branch head) vs. staff (nonsupervisory); (3) fleet-support shore activity vs. field shore activity.[2] First t tests were performed on each set of items to determine if there were overall significant differences ($p < .05$) among the various subgroups. Where the overall differences were significant, t tests were run on each item individually, those which proved significant at $p < .05$ are displayed in Tables 6-8.

Among the three sets, the one comparing military vs. civilian (Table 6) showed the most items differing significantly; the overall mean ratings of the military respondents were higher than those of the civilian respondents for familiarity, usefulness, and skill items. More familiarity and skill items differed than did usefulness items. The only civilian mean rating which was significantly greater than a military mean rating was that for "Variation in leadership techniques" as a method chosen most appropriate. The overall mean ratings of upper management (Table 7) were significantly higher than those of middle-lower management on the skill items and higher than staff on the usefulness items. However, since the majority (84%) of upper management respondents were military, the higher scores of upper management can be attributed to the overall higher ratings given by military. The overall mean ratings of fleet-support and field respondents differed significantly overall for familiarity and skill items, with the fleet-support respondents being higher. Since military and civilian respondents were fairly evenly distributed across the two types of activities, these differences cannot be attributed to the higher ratings by military.

A comparison was made among these same subgroups, according to the mean rating of the individual-centered vs. organization-centered techniques. Military responses were significantly higher ($p < .05$) on the average than civilian responses for both the individual-centered and organization-centered techniques on both familiarity ($t(676)=4.09$ for individual-centered items and $t(675)=5.50$ for organization-centered items) and usefulness ($t(670)=2.57$ for individual centered items and $t(670)=3.03$ for organization-centered items). The only other statistically significant differences ($p < .05$) were that upper management found the organization-centered techniques more useful than middle-lower management, $t(520)=2.02$ and respondents from fleet support activities were more familiar with organization-centered techniques than respondents from field activities, $t(549)=2.42$. The differences between the military and civilian means were about the same magnitude for both the individual and organization-centered techniques, indicating no interaction effects.

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[2]Operating fleet unit was not included as a third category in this last comparison due to the small number of respondents in this group.

Table 6

Statistically Significant Differences in MTI Responses of Comparison Group I

Item	Mean Rating	
	Military (N = 65)	Civilian (N = 48)
Familiarity		
Overall	3.68	3.27
Variation in Leadership Technique	3.55	3.08
Group Building	3.91	3.46
Administer Rewards/Punishment	3.98	3.31
Change Communication Pattern	3.52	2.94
Direct Conflict Resolution	3.57	3.00
Socialization	3.45	2.90
Distribution of Authority	3.52	2.81
Usefulness		
Overall	3.61	3.37
Administer Rewards/Punishment	3.59	3.12
Direct Conflict Resolution	3.67	3.19
Socialization	3.30	2.83
Skill		
Overall	3.53	3.07
Reports are Late	4.14	3.58
Personnel Reduction	3.33	2.85
Personal Theft	3.13	2.26
Poor Performance Rating	3.76	3.19
Vandalism	2.81	2.17
Racial Tension	3.22	2.72

Note. All differences cited in this table are significant at $p < .05$, two-tailed test.

Table 7

Statistically Significant Differences in MTI Responses of Comparison Group II

Item	Mean Rating: Upper Management (N = 34)	Mean Rating: Middle-Lower Management (N = 54)	Mean Rating: Staff (N = 19)
Usefulness			
Overall	3.62		3.36
Direct Conflict Resolution	3.91		3.21
Skill			
Overall	3.46	3.24	
Racial Tension	3.50	2.83	

Note. All differences cited in this table are significant at $p < .05$, two-tailed test.

Table 8

Statistically Significant Differences in MTI Responses of Comparison Group III

	Mean Rating: Fleet-support Activity (N = 50)	Mean Rating: Field Activity (N = 42)
Familiarity		
Overall	3.57	3.40
Variation in Leadership Technique	3.58	3.10
Skill		
Overall	3.40	3.19
Personal Theft	3.06	2.38
Bickering	3.63	3.20
Racial Tension	3.35	2.62

Note. All differences cited in this table are significant at $p < .05$, two-tailed test.

Three factor analyses (principal components, varimax rotation) were performed, one on the familiarity items, one on the usefulness items, and one on the skill items. The criterion for including an item in a factor was that it have a factor loading of at least .40. Table 9 presents the results for the familiarity and usefulness items. As shown, two factors emerged from the familiarity items, and all 12 techniques are represented on at least one of these two factors. Moreover, the factors are fairly distinct, with only two techniques loading on both factors ("Administration of rewards and punishments" and "Direct conflict resolution"). The factor structure of the usefulness items appears more complicated, with four factors emerging. The fourth factor is the simplest to interpret since it is comprised of the two training techniques, neither of which loaded on any other factor. "Variation of leadership technique" and "Administration of rewards and punishments" load uniquely on Factor III, which also has "Distribution of authority." Factor II consists of six items and therefore seems the most complex of the four. Factor I consists of three items.

Table 9

Factor Loadings for the MTI Familiarity and Usefulness Scales

Technique	Factor Loadings[a]					
	Familiarity		Usefulness			
	I	II	I	II	III	IV
Technical education/training		.63				.76
Job redesign, job enrichment		.49		.46		
Match of job and person		.57		.56		
Variation in leadership technique	.55				.41	
Performance appraisal		.48		.60		
Group building	.58			.54		
Administration of rewards and punishments	.50	.45			.74	
Change communications patterns	.82		.81			
Interpersonal education/training		.71				.48
Direct conflict resolution	.42	.48		.47		
Socialization	.69		.49	.41		
Distribution of authority	.56		.42		.42	

[a]Only factor loadings of .40 and above are included in this table.

For the skill items, two factors emerged (See Table 10). Three of the problems ("Personnel reduction," "Bickering," and "Racial tension") did not load on either factor. Factor I is made up of four problems and does not lend itself to a clearcut interpretation. Factor II consists of the five problems which people rated themselves on the average as most skillful in solving of all 10 problems. Moreover, with the exception of "Rumors," these tend to all be task-oriented problems as opposed to interpersonal problems.

Table 10

Factor Loadings for the MTI Skill Items

Problem	Factor Loadings[a] I	II
Reports are late	.85	.54
Personnel reduction		
Personal theft	.88	
Poor performance rating	.54	.60
Vandalism	.76	
Low product output/material readiness		.69
Rumors		.54
Bickering		
Racial tension		
Task outside scope of mission		.66

[a]Only factor loadings of .40 and above are included in this table.

In the course of feeding back MTI data in the classroom situation, suggestions were solicited regarding improving the MTI itself. These suggestions offered included the following:

1. The explanation of "Interpersonal education/training" needs modification to clearly differentiate it from "Technical education/training."

2. The term "Socialization" was interpreted in a number of different ways, and the term "Social control" was considered to be a good replacement.

3. The term "Building teamwork" was considered a more explicit substitute for the term "Group building."

The students agreed that asking for three most appropriate and three least appropriate techniques to solve each of 10 problems was too difficult a task, and they suggested reducing the number of techniques to one or two.

DISCUSSION

The most intriguing result is that those techniques chosen to be most appropriate for solving the 10 specific problems were the ones rated as less familiar and less useful. There are a number of possible explanations for this finding. First, it is possible that, in fact, Navy managers are not as familiar as they could be with the techniques which they believe to be appropriate ways of solving these problems. In other words, one way in which this result can be interpreted is as follows: What Navy managers are taught, observe, and hear about, are the techniques with which they are most familiar. What is most familiar in turn is that which is judged most useful in general (i.e., in the abstract). However, on being given a list of problems, some of the less familiar ones are the ones which are judged most appropriate, while the more familiar ones are not generally found applicable. If this is the explanation and if, in fact, these are important problems which Navy managers should be able to solve, this result points to management training needs within the Navy community.

Another possible explanation for these findings is that the problem set is not representative of the problem situations with which Navy managers have to deal; therefore, they would not be expected to be familiar with the appropriate problem-solving techniques. On the other hand, it is not reasonable to argue that the 10 problems are not important ones that Navy managers should be able to solve. If, in fact, this is the explanation, one could infer that Navy managers focus their energy on solving problems of lesser importance, neglecting those important problems because they are not sufficiently familiar with the leadership techniques required for solution. The overall results on the skill items indicate Navy managers are more confident with task-oriented than interpersonal-oriented problems. The suggestion that Navy managers spend their energies on problems (1) which are task-related and (2) which they have the required leadership skills to solve is not peculiar to the Navy. However, it may be more pronounced there due to the technical/scientific/engineering backgrounds of most Navy managers. This management problem exists almost everywhere: supervisors and managers who have had experience or training in technical functions tend to continue to focus too much attention on the task itself and give too little attention to personnel and human resource management issues.

A third possible explanation for this discrepancy is that managers pick less familiar techniques as most appropriate because they have not tried these techniques. It is easy to be optimistic about the efficacy of techniques which one has never employed; one is inclined to be more realistic about the shortcomings of methods one has already used.

The fact that individual-centered techniques were judged as more familiar and useful than organization-centered techniques supports the contention that Navy managers conceptualize organizational effectiveness as the sum of the effectiveness of all individuals in the unit. In the area of personnel research, the Navy has historically supported studies on recruiting, testing, placing, training, and retaining individual members. Little effort has been directed

toward measuring and improving factors associated with group or organizational effectiveness. Arima (1974) cited the results of a survey of Navy officers and civilians who sponsor personnel research which underscores this fact. The respondents were asked to rank 18 R&D program elements according to (1) the importance of their payoff to the Navy and (2) the likelihood of research in the element being successful. On both criteria, the respondents ranked research pertaining to individuals (e.g., educating, retaining, recruiting) as high, and research pertaining to organizational effectiveness, as very low.

As far as the specific techniques are concerned, "Group Building" is the one technique rated high on all three dimensions: familiarity, usefulness, and appropriateness. Moreover, it was rated as most appropriate for solving the specific problems three times as often as the least frequently chosen technique ("Performance Appraisal"), and was four percentage points higher than the technique chosen next most frequently ("Change Communication Patterns"). It was also the only organization-centered technique which was rated overall in the top five techniques on the familiarity and usefulness scales. Because of the significant amount of reliance which Navy managers place on this particular technique, it might be useful to explore by means of interviews why "Group Building" is judged similarly across all dimensions and why it is relied upon so much relative to other techniques.

The factor analysis of the familiarity items yielded a fairly "clean" structure consisting of two factors; that is, most techniques loaded fairly highly on only one of the two factors. The factor analysis of the usefulness items indicated a considerably more complex structure than the one for familiarity, although again the four factors are quite clean. Prior to doing this factor analysis, the investigators had considered eliminating either the familiarity or usefulness scale since the means and standard deviations on both were so similar, specifically, none of the corresponding familiarity and usefulness means were significantly different. However, in view of their different factor structures, it was decided to keep both scales in the next version of the instrument. The factor analysis of the skill items did not yield as clean a factor structure, and three of the items did not load on either of the two factors. This analysis underscores the need for further developmental work on the problem set. None of the factors emerging from these analyses can be easily labeled with the exception of usefulness Factor IV, which clearly pertains to education and training.

The technique of socialization was designated, a priori, as individual-centered. However, the results suggest that it ought to be considered as an organization-centered technique. First, the factor analysis shows it as being grouped more with organization-centered than individual-centered techniques. Second, it was perceived as less useful and less familiar than most individual-centered techniques.

The fact that the MTI could discriminate between the attitudes of various subpopulations, such as military vs. civilian managers, is a point worth noting. The ability of the instrument to make such discriminations is a positive asset which indicates its potential usefulness as an assessment tool.

Experience using the instrument in a classroom situation suggests that the MTI might serve as a basis for a leadership training package. A possible model to use for further development along these lines is that of the training package developed by Vroom and Yetton (1973). In their approach, managers indicate how they would solve 30 case problems in terms of their leadership style. There are five styles from which to choose, ranging from highly authoritarian to highly participative. An individual feedback package is produced from these answers, comparing the individual to the norms of his or her peers and against the "correct" decision rules for selecting the appropriate styles. The training begins with the presentation of the feedback and consists of teaching the decision logic and rules for selecting the most appropriate leadership style for different kinds of problem situations. The MTI could be developed along similar lines while maintaining its unique advantages; namely, it is not time-consuming to complete and it is technique-oriented rather than theory-oriented. In other words, it is more practical in nature and not highly analytic for those managers who need to know something more about management practices but cannot afford a significant time investment. This situation is appropos of the Navy in which there are very large numbers of people in leadership positions and limited resources for LMET.

CONCLUSIONS

It is concluded that Navy managers feel more familiar with and are inclined to employ traditional, less complicated leadership methods. At the same time, however, they are aware of the appropriateness of using more contemporary, sophisticated methods of management to solve some important personnel problems. Moreover, the results suggest that Navy managers give more attention to solving task-oriented rather than interpersonal-oriented problems, although further research is needed to support this contention.

The military sample perceived all techniques to be more familiar and useful than did the civilian sample. This finding adds support to the investigators' belief that civilian managers in the Navy are less self-confident about their leadership skills than are their military counterparts.

The advantages of the MTI as it stands are that it (1) is self-explanatory, (2) is fairly simple to administer and analyze, and (3) has face validity to the respondents. Moreover, it discriminates across different subpopulations of respondents such as military vs. civilian. Based on the apparent usefulness of the information derived thus far from using the MTI, and based on the reactions of the respondents' to the instrument, it is concluded that further development of the inventory is justified.

RECOMMENDATIONS

There are four categories of recommendations. They are those pertaining to (1) the implications of the results for LMET in the Navy, (2) the revision of the instrument itself, (3) its potential use as an assessment tool, and (4) its potential use as a training tool.

The overall pattern of results identifies some broad Navy training needs in the area of leadership and management. In particular, Navy managers do not appear to feel sufficiently familiar with modern, sophisticated techniques of leadership which entail the manipulation of factors beyond individuals themselves. In other words, their solutions to the problem of poor individual performance frequently deal only with the individual and not with the broader sociotechnical environment. It will not be beneficial to overall organizational effectiveness for Navy managers to continue to rely on traditional techniques which have become outmoded for handling many contemporary personnel problems. It is therefore recommended that in the Navy's redesign of its LMET programs for both military and civilians, emphasis be placed on (1) organization-centered methods and (2) a contingency approach to management (i.e., specifying the circumstances for which it is most appropriate to use certain techniques).

As far as the inventory itself is concerned, immediate changes should be made to incorporate the suggestions regarding wording, clarity, and terminology. Over the longer term, effort should be devoted to improving the specific problem set (1) to insure that it is representative and (2) to see that the problems are stated in sufficient detail to denote the same situation to all respondents. The latter might entail short case descriptions rather than simply one or two sentences. Another decision eventually required will be whether to keep an "omnibus" instrument which is general enough to be meaningful to diverse subpopulations or to develop a number of forms of the instrument which are tailormade to specific subpopulations. The former option makes it possible to compare different types of managers, while the latter option makes it possible to get specific information regarding unique management attitudes and needs.

Regarding use as an assessment instrument, the MTI has potential for determining leadership and management needs if evidence can be compiled that the respondents' expressed attitudes in fact do reflect actual strengths and weaknesses in their use of management techniques. Therefore, efforts should be undertaken to validate the inventory; that is, to prove that the inventory can (statistically) predict leadership strengths and deficiencies. The most ideal form such a validation could take would be to relate attitudes as expressed in the inventory to actual managerial behavior. If validated, the inventory could be used to discriminate the differing leadership training needs of different populations in the Navy so that the training could be more individually tailored to the needs of subpopulations than it is now. For example, the management techniques needed by those in support functions, such as the Civil Engineering Corps, probably differ substantially from the ones required by line officers in operational units. A particularly important difference to examine further is between the perceptions of the military vs. civilian managers

regarding leadership. It is believed that the interface of military and civilian managers is frequently a source of dysfunction in Navy organizations and that the use of instruments such as the MTI could help to diagnose where such problems exist. Similarly, the management techniques needed by first-line supervisors differ from those appropriate for middle and upper level managers and executives. Given the current efforts in the Navy to design leadership and management training, such an assessment instrument could be highly useful.

Regarding use as a training tool, it is recommended that further work be done in this direction. Steps would include the development of a computer program that would produce an individual feedback package comparing the respondent to group norms. In addition, a determination must be made regarding what the "correct" responses are; that is, which techniques in fact are most appropriate for solving which problems and why. This information would be incorporated into the training package and form the basis for lecture and group discussion in a leadership training course. The determination of what the most appropriate techniques are could be done in a number of ways, ranging from a literature review of relevant empirical findings to getting a consensus from a group of experts in the field, such as management professors or consultants.

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APPENDIX A

MANAGEMENT TECHNIQUES INVENTORY

MANAGEMENT TECHNIQUES INVENTORY

Below are described a number of methods for solving problems and enhancing effectiveness in organizations. How much familiarity do you have with the uses and principles pertaining to each of these methods? Write the number of your response to the left of each method.

5	4	3	2	1
Great deal of familiarity		Moderate amount of familiarity		No familiarity

_____1. Technical education/training. Send individuals to school or provide them with on-the-job training to remedy deficiencies in their technical skills or knowledge.

_____2. Job redesign, job enrichment. Increase the job variety, increase the scope of responsibilities, decrease the amount of supervision, etc.

_____3. Match of job and person. Make good person-job match by assigning or re-assigning people to jobs with which they would be compatible.

_____4. Variation in leadership technique. Introduce variations in your leadership techniques.

_____5. Performance appraisal. Provide feedback to personnel regarding their weaknesses and strengths, good actions and mistakes.

_____6. Group building. Take actions which would result in a work group functioning as a unified team with group loyalty rather than simply a loose collection of individuals.

_____7. Administration of rewards and punishments. Administrate tangible incentives, both positive and negative, e.g. liberal leave policy, parking spaces close to the building, discipline, etc.

_____8. Change communication patterns. Modify the way in which information is reported, up or down the chain of command, either in terms of the form or the people involved in the communication chain.

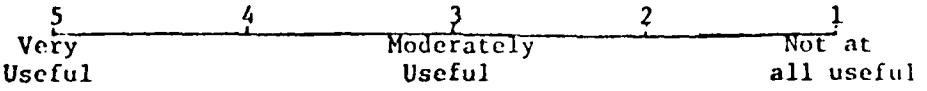
_____9. Interpersonal education/training. Send individuals to school or provide them with on-the-job exposure/guidance to enhance their ability to relate to others and to work effectively with others.

_____10. Direct conflict resolution. Bring together (either directly or indirectly) those individuals or groups who are creating dysfunctional conflict to confront the issues and resolve them.

_____11. Socialization. Use peer influence, group norms, and supervisory influence to inform new personnel or re-assigned personnel what their roles are and what is expected of them.

_____12. Distribution of authority. Modify the pattern of distribution of authority, e.g., moving the responsibility for certain decisions up or down in the hierarchy, centralizing or decentralizing, increasing or decreasing span of control, etc.

Rate each method (as defined on previous page) in terms of its usefulness to you as a tool to employ in your job. Write the number of your response to the left of each method.



_____1. Technical education/training

_____2. Job redesign, job enrichment

_____3. Match of job and person

_____4. Variation in leadership technique

_____5. Performance appraisal

_____6. Group building

_____7. Administration of rewards and punishments

_____8. Change communication patterns

_____9. Interpersonal education/training

_____10. Direct conflict resolution

_____11. Socialization

_____12. Distribution of authority

For each situation listed below indicate the three methods most appropriate for use in remedying the problem and the three methods least appropriate. Mark your responses on the lines to the left of each problem, putting in the numbers of the most appropriate methods on the first line, and numbers of the least appropriate, on the second line.

EXAMPLE: Most appropriate 9, 6, 8

Least appropriate 3, 7, 4

Methods

1. Technical education/training
2. Job redesign, job enrichment
3. Match of job and person
4. Variation in leadership techniques
5. Performance appraisal
6. Group building
7. Administration of rewards and punishments
8. Change communication patterns
9. Interpersonal education/training
10. Direct conflict resolution
11. Socialization
12. Distribution of authority

Problem situations

Most_____ Least_____ 1. Required reports from one of the departments in your unit are frequently late or incorrect.

Most_____ Least_____ 2. Your unit is faced with a personnel reduction.

Most_____ Least_____ 3. In your unit, theft of personal items is becoming more prevalent.

Most_____ Least_____ 4. Your unit has just received a poor performance rating on an Inspector General or Type Commander inspection.

Most_____ Least_____ 5. A high rate of vandalism is present in your unit.

Most_____ Least_____ 6. Product output or material readiness in your unit is low.

Most_____ Least_____ 7. You find that erroneous rumors are rampant in your unit.

Most_____ Least_____ 8. You notice that two supervisors in your unit are constantly bickering between themselves.

Most_____ Least_____ 9. In your unit there has been a number of incidents of racial tension.

Most_____ Least_____ 10. Your unit is assigned a task which falls outside the scope of its normal mission.

Rate below these same ten situations in terms of how much skill/knowledge you have in solving them.

5	4	3	2	1
Great deal of skill		Moderate amount of skill		Very little skill

_____ 1. Reports are late

_____ 2. Personnel reduction

_____ 3. Personal theft

_____ 4. Poor performance rating

_____ 5. Vandalism

_____ 6. Low product output/material readiness

_____ 7. Rumors

_____ 8. Bickering

_____ 9. Racial tension

_____ 10. Task outside scope of mission

CIRCLE THE APPROPRIATE RESPONSE

1. What is your rank/grade?

   A. O-6
   B. O-5
   C. O-4
   D. GS-15
   E. GS-14
   F. GS-13
   G. GS-12 or below

2. What is your organizational position?

   A. CO
   B. XO
   C. PCO
   D. PXO
   E. Technical Director
   F. Department head (Primary organizational units)
   G. Division head (Secondary organizational units)
   H. Branch head (Tertiary organizational units)
   I. Staff position (Non-supervisory)

3. What type of organization are you attached to or en route to?

   A. Operating fleet unit
   B. Shore activity-direct fleet support
   C. Shore activity-field activity

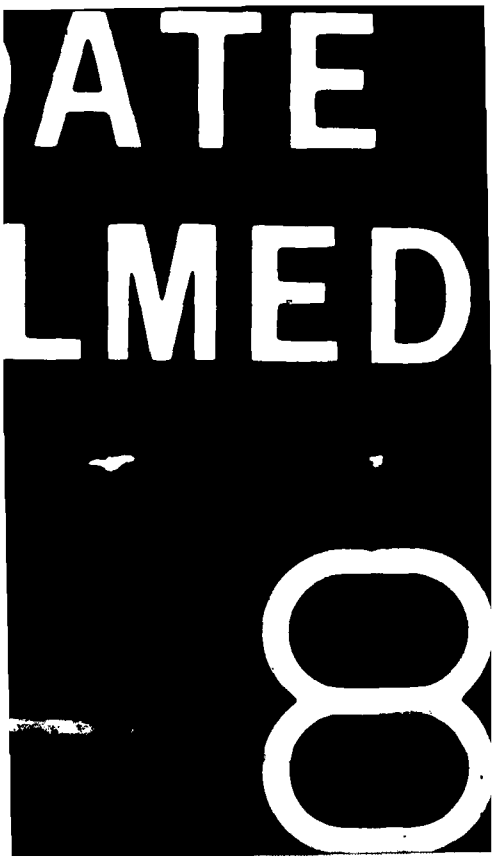
4. For PCO's and PXO's only, what was your last organizational position?

   A. CO
   B. XO
   C. Department head
   D. Division head
   E. Branch head
   F. Staff position

5. For PCO's and PXO's only, what type of organization did you just leave?

   A. Operating fleet unit
   B. Shore activity-direct fleet support
   C. Shore activity-field activity

Thank you for your responses. If you have any remarks you would like to make regarding the contents of this instrument, please do so below or on the back.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